

WE CLAIM:

1. A method of ablating tissue in the heart to treat atrial fibrillation comprising the steps of

5 introducing into a selected atrium an elongated energy emitting element that can be flexed along its length from a generally straight shape into a variety of curvilinear shapes,

10 exposing the element to a region of the atrial wall while flexing the element into a desired shape,

applying ablating energy to the element to thermally destroy tissue, forming an elongated lesion having a contour that follows the flexure of the element, and

15 repeating the exposing, flexing and energy application steps at different spaced regions along the atrial wall to form a convoluted lesion pattern comprising elongated straight lesions and elongated curvilinear lesions that direct electrical impulses
20 within the atrial myocardium along a path that activates the atrial myocardium while interrupting reentry circuits that, if not interrupted, would cause fibrillation.

2. A method according to claim 1 wherein in the step of applying ablating energy, radiofrequency electromagnetic energy is applied.

3. A method according to claim 1 and further including the step of introducing a viewing probe into the selected atrium to monitoring the position of the element during the
5 step of exposing the element to the atrial wall.

4. A method according to claim 1 wherein, in the step of introducing the

element, the element is introduced through vascular approach, without opening the heart.

5. A method of ablating tissue in the heart to treat atrial fibrillation comprising the steps of

5 introducing into a selected atrium an energy emitting element comprising
a three-dimensional array of longitudinal main splines extending in a circumferentially spaced relationship to form a basket, and
10 one or more transverse bridge splines that periodically span adjacent main splines,
at least some of the main splines having elongated regions of energy emitting material longitudinally spaced among regions of non-energy emitting material, and
15 at least one of the bridge splines having a region of energy emitting material that intersects a region of energy emitting material on a main spline,
20 exposing the element to the atrial wall, and
applying ablating energy simultaneously to at least some of the energy emitting regions of the element to thermally destroy tissue and form a convoluted lesion pattern comprising elongated
25 straight and elongated curvilinear lesions that direct electrical impulses within the atrial myocardium along a path that activates the atrial myocardium while interrupting reentry circuits that, if not interrupted, would cause fibrillation.
30

6. A method according to claim 5 and further including the steps of

introducing into the selected atrium a

5 second elongated energy emitting element that can be
flexed along its length from a generally straight
shape into a variety of curvilinear shapes,

10 exposing the second element to a region of
the atrial wall at selected parts of the convoluted
lesion pattern, while flexing the element into a
desired shape, and

15 applying ablating energy to the second
element to thermally destroy tissue to form an
elongated lesion having a contour that follows the
flexure of the element and that becomes a part of
the convoluted lesion pattern.

7. A method according to claim 5 and
further including the steps of

5 collapsing the three-dimensional array upon
itself before the step of introducing the element
into the selected atrium, and

returning the array to its three-
dimensional configuration before exposing the
element to the atrial wall.

8. A method according to claim 5

wherein, in applying the ablating energy,
the energy is applied to create iso-electric paths
along the main and bridge splines.

9. A method according to claim 5

wherein in the step of applying ablating
energy, radiofrequency electromagnetic energy is
applied.

10. A method according to claim 5

5 and further including the step of deploying
a viewing probe into the selected atrium to monitor
the position of the element during the step of
exposing the element to the atrial wall.

11. A method according to claim 5

wherein, in the step of introducing the

106550-88202860

5 12. A method of assembling a composite
structure for ablating tissue within the body
comprising the steps of

10

15

20

wherein the steps of creating energy emitting and non-energy emitting zones comprise the steps of making the element from a non-energy emitting material and affixing an energy emitting

5

wherein the step of creating an energy emitting zone comprises coating the non-energy emitting element with an energy emitting material.

wherein the steps of creating energy emitting and non-energy emitting zones comprise the steps of making the element from an energy emitting material and affixing a non-energy emitting material to the element to create the energy emitting and non-energy emitting zones.

wherein the step of affixing the non-energy emitting material comprises coating the element.

21. A structure according to claim 20

22. A structure according to claim 20

23. A structure according to claim 22

24. A structure according to claim 20

25. A structure according to claim 24

wherein the energy emitting zone creates a lesion that has a width that is no greater than about 5 mm.

26. A method of assembling a composite structure for ablating tissue within the body comprising the steps of

5 creating a template that displays in planar view a desired lesion pattern for the tissue comprising at least two longitudinal lesion regions, at least one transverse lesion region intersecting one of the longitudinal lesion regions, and a region that is free of lesions,

10 laying on the template an array of spaced apart longitudinal elements, with at least one longitudinal element overlying each region where the template displays a longitudinal lesion,

15 laying on the template a transverse element that intersects one of the longitudinal elements and overlies the region where the template displays a transverse lesion,

20 creating an energy emitting zone on each longitudinal and transverse element where the template displays a lesion region,

creating a non-energy emitting zone on each longitudinal and transverse element where the template displays a lesion-free region, and

25 overlaying the longitudinal and transverse elements to form the composite structure.

27. A method according to claim 26

5 wherein the steps of creating energy emitting and non-energy emitting zones comprise the steps of making the element from a non-energy emitting material and affixing an energy emitting material to the element to create the energy emitting and non-energy emitting zones.

5

5

36. A structure according to claim 34 wherein the energy emitting zone form a lesion that has a length to width ratio that is at

longitudinal and transverse element where the template displays a lesion region,

25 creating a non-energy emitting zone on each
longitudinal and transverse element where the
template displays a lesion-free region,

overlaying the longitudinal and transverse elements to form the composite structure,

30 introducing the composite structure into
 the selected atrium,

exposing the composite structure to the atrial myocardium, and

35 applying ablating energy to the energy
emitting zones to form the desired lesion pattern in
the atrial myocardium.

41. A method according to claim 40

wherein, in introducing the composite structure, the composite structure is introduced by vascular access, without opening the heart.

42. A method according to claim 40

wherein the step of overlaying the longitudinal and transverse elements forms a three-dimensional shape.

43. A method according to claim 42

wherein, the three-dimensional shape is that of a basket.